

REMARKS

I. INTRODUCTION

By the current amendment, claims 1-3 have been cancelled without prejudice, and new claims 4-12 have been added. No new matter has been added herein, as support for the new claims can be found in the specification at, *inter alia*, substitute page 3, lines 8-30; substitute page 5, line 29 to substitute page 6, line 2; and Figures 1(a) - 1(g).

The Office Action of March 18, 2002 and the references cited therein have been carefully studied and, in view of the foregoing amendments and following remarks, reconsideration and allowance of this application are most respectfully requested.

II. OBJECTIONS TO THE DISCLOSURE

In the Office Action mailed on March 18, 2002, the Examiner has objected to the disclosure due to margin errors on the top of pages 2-12 of the specification, and due to a grammatically confusing sentence bridging lines 12-13 of page 2. By the current amendment, substitute pages,

meeting the requirements set forth in 37 C.F.R. § 1.52, for originally filed pages 2-12 have been submitted. In addition, the aforementioned grammatically confusing sentence has been clarified by deletion of the word "is" therein. As these substitute pages address the Examiner's objections, it is respectfully submitted that these objections to the disclosure have been overcome and should therefore be withdrawn.

III. REJECTIONS UNDER 35 U.S.C. § 102(b)

The Examiner has rejected claim 1 under 35 U.S.C. § 102(b) as being anticipated by EP 0 579 151 A2 ("Moore *et al.*") or EP 0 757 088 A2 ("Enokida *et al.*"). The Examiner's position is respectfully traversed and withdrawal of this rejection is believed to be warranted for at least the following reasons.

Claims 1-3 have been cancelled without prejudice by the current amendment, and new claims 4-12 have been added herein. New claims 4-12 include the claim limitation of a "heavy metal" which has been defined in the specification as a metal having an atomic number of at least 72. *See* specification, substitute page 3, lines 20-21.

In contrast to the present invention as currently recited in claims 4-12, Moore *et al.* and Enokida *et al.* do not teach nor suggest the use of a heavy metal in an organometallic compound. Moore *et al.* discloses aluminum chelates for use in internal junction organic electroluminescent devices. Aluminum is a metal with an atomic number of 13. Enokida *et al.* discloses gallium compounds which are suitable for use in an electroluminescent device. Gallium is a metal with an atomic number of 31. Because neither Moore *et al.* nor Enokida *et al.* teach or suggest the use of

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a heavy metal in an organometallic compound as presently claimed in claims 4-12, each reference fails to teach or suggest each and every element of the present invention as recited in claims 4-12. Thus, Applicants respectfully submit that the rejection under 35 U.S.C. § 102(b) has been overcome and should therefore be withdrawn.

III. REJECTIONS UNDER 35 U.S.C. § 103(a)

The Examiner has also rejected claims 1-3 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,310,360 ("Forrest *et al.*") in view of "Photochemistry and Luminescence of Cyclometallated Complexes" (1992) ("Maestri *et al.*"). The Examiner's position is respectfully traversed and withdrawal of these rejections is believed to be warranted for at least the following reasons.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103(a), not only must the prior art teach or suggest each element of the claim, but the prior art must also suggest combining the elements in the manner contemplated by the claim. *See Northern Telecom, Inc. v. Datapoint Corp.*, 908 F. 2d 931, 934 (Fed. Cir. 1990), *cert. denied*, 111 S. Ct. 296 (1990); *In re Bond*, 910 F. 2d 831, 834 (Fed. Cir. 1990). The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. *See* M.P.E.P. § 2142. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Moreover, this teaching or suggestion to make the modification must be found in the prior art and not in the Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

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Forrest *et al.* is directed to intersystem crossing agents for efficient utilization of excitons in organic light emitting devices. Forrest *et al.* discloses that an organic light emitting device can comprise a molecule which can function as an intersystem crossing agent, such as a phosphorescent sensitizer, such as Ir(ppy)₃. See Forrest *et al.*, col. 9, lines 1-50. However, as the Examiner has admitted, "Ir(ppy)₃ does not meet the limitations of the organometallic compound required by present claim 1 because it contains more than one carbon-coordination ligand." Office Action mailed on March 18, 2002, page 4, paragraph 6. As new claims 4-12 also include the claim limitation of "a single carbon-coordination ligand bound to the heavy metal," Ir(ppy)₃ also does not meet the limitations of the organometallic compound required by present claims 4-12.

Maestri *et al.* is directed to the photochemistry and luminescence of cyclometallated complexes. In regard to the anionic Pt(ppy)(Cl₂), Maestri *et al.* discloses that its lowest energy excited state is a MLCT state, and that it is "luminescent at 77K and at room temperature as a solid, and at 77 K in rigid matrix, but no luminescence is detected at room temperature in fluid solution." Maestri *et al.*, page 48, lines 4-6; see Maestri *et al.*, page 48, lines 1-11.

In contrast to the teachings of Forrest *et al.* and Maestri *et al.*, the organometallic compound of the present invention, as recited in claims 4-11, is present in an organic light emitting device and includes "a single carbon-coordination ligand bound to [a] heavy metal, wherein the single carbon-coordination ligand is a mono-anionic carbon-coordination ligand; and at least one non-carbon-coordination ligand [is] bound to the heavy metal." As described in the specification, Applicants surprisingly found that "OLEDs incorporating emissive organometallic compounds having a single mono-anionic carbon-coordination ligand have substantially higher external quantum efficiencies

than compounds with bis-substituted carbon-coordination ligands.” Specification, substitute page 5, lines 29-32. For example, $(ppy)Pt(acac)$ was found to produce strong photophosphorescence at room temperature, while $Pt(ppy)_2$ was found not to produce any visible photophosphorescence at room temperature. See specification, substitute page 5, line 32 to substitute page 6, line 2.

Although the Examiner alleges that “[o]ne of ordinary skill in the art at the time of the invention, having knowledge of the teachings of Maestri *et al.*, would have reasonably expected anionic $Pt(ppy)(Cl_2)$ to be useful as a sensitizer in an organic EL device such as taught by Forrest *et al.* because the platinum compound is luminescent at room temperature as a solid, has the same carbon-coordination ligand as the iridium compound, undergoes MLCT excitation as does the iridium compound, has a λ_{max} absorption similar to that of the iridium compound, and has a λ_{max} emission similar to that of the iridium compound,” Applicants respectfully disagree. Although Maestri *et al.* discloses that anionic $Pt(ppy)(Cl_2)$ is “luminescent at 77K and at room temperature as a solid, and at 77 K in rigid matrix,” Maestri *et al.* goes on to teach that “no luminescence is detected [in $Pt(ppy)(Cl_2)$] at room temperature in fluid solution.” Maestri *et al.*, page 48, lines 4-6. Thus, Maestri *et al.* discloses that $Pt(ppy)(Cl_2)$ may or may not be luminescent at room temperature, depending on its form. However, there is no teaching nor suggestion in Maestri *et al.*, Forrest *et al.* or elsewhere in the prior art that room temperature luminescence as a solid compound translates into efficient luminescence as a compound in a conventional organic light emitting device. Thus, there is no teaching, suggestion nor motivation which would motivate one of ordinary skill in the art to combine and modify these references in an attempt to arrive at the presently claimed invention, and the Examiner has pointed to no such teaching, suggestion, or motivation.

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Thus, it is respectfully asserted that these rejections under 35 U.S.C. § 103(a) have been overcome and should therefore be withdrawn.

IV. CONCLUSION

In view of the foregoing amendment and remarks, Applicants respectfully submit that all of the pending claims of the subject application are now in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.


Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Originally filed pages 2-12 of the specification have been replaced with the attached substitute pages 2-12 which meet the requirements set forth in 37 C.F.R. § 1.52.

IN THE CLAIMS:

Claims 1-3 have been cancelled without prejudice.

New claims 4-12 have been added.